

**REMARKS**

Claims 10 to 13, 16 to 27, 30, 31, 33, 38 to 41, 44, 45, and 47 to 71 are pending in the application. The Examiner has subjected the claims to a restriction requirement and claims 10 to 13, 17 to 27, 30, 31, 38 to 41, and 47 to 56 have been withdrawn from consideration. The Examiner has stated that Applicants have made a priority claim to U.S. Application 08/705,372 and 09/246,167 but have not amended their disclosure to perfect such a claim as required. The Examiner has maintained the restriction requirement. Claims 16, 33, 44, 45, and 57 to 71 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing particularly to point out and distinctly to claim the subject matter that Applicants regard as the invention. Claims 57 to 60 and 64 to 66 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 16, 33, 44, 45, 57 to 61, and 64 to 66 stand rejected under 35 U.S.C. §102(b) as being anticipated by Tsubaki et al. (U.S. Patent 4,448,948). Claim 62 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tsubaki et al. Claims 16, 33, 45, and 69 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tsubaki et al. Claims 16, 44, 57 to 59, 61, 62, 64, and 65 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yokoshima et al. (EP 0 663 411 A1).

With respect to the priority claim for the present application, Applicants have amended the specification as indicated. Applicants are also submitting a petition to accept an unintentionally delayed claim for priority, a copy of which is attached hereto.

Regarding the restriction requirement, Applicants continue to traverse the requirement and confirm the election of claims 16, 33, 44, 45, and 57 to 71 for prosecution.

Concerning the rejection of claims 16, 33, 44, 45, and 57 to 71 under §112, second paragraph, the Examiner has stated that the language "said crosslinking or chain extension occurring through linking groups formed by a reaction between epoxy groups contained on at least some of the monomer repeat units of the precursor polymer and an amine curing agent" is confusing because it is not clear to what "an amine curing agent" refers, i.e., whether the amine curing agent is a second component of the composition or a reactant with epoxy groups to form the crosslinked or extended polymer, or whether the amine curing agent is part of the process of making the polymer or part of the mixture that makes up the composition. The Examiner has also questioned whether "between" refers to one epoxy group with another or between two epoxy groups.

Applicants have amended claim 16 as indicated to state that the crosslinking or chain extending reaction takes place between epoxy groups on the precursor polymer and amine groups on the amine curing agent, and believe that this amendment eliminates any possible basis for this portion of the rejection. With respect to the Examiner's statement that it is not clear whether the amine curing agent is a second component of the composition or a reactant, Applicants point out that the instant claim language encompasses, and is intended to encompass, both embodiments wherein the amine curing agent is present in the composition together with the precursor polymer as a

second component prior to the crosslinking or chain extension reaction and embodiments wherein the amine curing agent is added to the precursor polymer immediately prior to the crosslinking or chain extension reaction. The claim is directed to the final crosslinked or chain extended polymer wherein the crosslinks or chain extensions are formed by the reaction of amine groups and epoxy groups, and the method by which these crosslinks or chain extensions are formed does not limit the present invention. Applicants accordingly respectfully request reconsideration and withdrawal of this ground for rejection.

With respect to the rejection of claims 16, 33, 44, 45, 57 to 60, and 64 to 71 under §112, second paragraph, the Examiner has stated that  $n$  is defined as an integer representing the number of repeating monomer unit but is not defined by limit, and that since integers are inclusive of zero, it is unclear whether the precursor structure is present. While Applicants are of the position that the claim language as originally filed satisfies the requirements of §112, second paragraph, to facilitate prosecution, Applicants have amended claim 16 to recite that  $n$  is at least 2. Support for this amendment can be found in the application at, for example, page 59, line 11. Applicants believe that this amendment eliminates any possible basis for this rejection.

Regarding the rejection of claims 16, 33, 44, 45, 57 to 60, and 64 to 71 under §112, second paragraph, the Examiner has stated that the meaning of the formula in claim 16 is confusing in that claim 16 does not define the precursor polymer and that the polymer shown has no epoxy groups present. Applicants have amended claim 16 as indicated to clarify that the structure first shown in the claim represents

the backbone of the crosslinked polymer (i.e., that it does not show the crosslinking groups), and also to provide a structure of the precursor polymer having epoxy groups thereon, and believe that this amendment eliminates any possible basis for this ground for rejection.

Further with respect to this rejection, and also with respect to the rejection of claims 64 to 66 under §112, second paragraph, the Examiner has stated that the polymer of claim 16 has no allyl ether groups thereon as recited in claim 66 and that there is an issue of what are the photosensitivity imparting groups of claims 64 to 66 as well. Applicants have amended claims 64 to 66 to clarify that the groups referred to therein are epoxy groups on the precursor polymer, and believe that this amendment eliminates any possible basis for this ground for rejection.

The Examiner has stated that while the specification states that "the phenyl groups and the A and/or B groups may also be substituted, this is not a part of the claimed invention because this is not a definition of the formula in claim 16". Applicants are of the position that the formula in claim 16 is to be interpreted in view of the specification, and that this statement in the specification clearly indicates that the structure shown may also include substituents. Nevertheless, to facilitate prosecution, Applicants have amended claim 16 to clarify that the phenyl groups and the A and B groups may be substituted.

Concerning the rejection of claims 16, 33, 44, 45, and 57 to 71 under §112, second paragraph, the Examiner has stated that the meaning of "amine curing agent" could be any amine that can crosslink epoxy resins or crosslink via epoxy resins with thermal activation, that the

claim does not exclude room temperature amine curing agents, that the amine curing on page 100 of the specification refers to curing occurring upon the application of heat, and that it is accordingly not clear whether the amine curing agent of claim 16 is intended to be limited only to those amines that cure under heating.

Applicants point out that claim 16 was part of the original disclosure as filed, and that this claim as originally filed did not limit the amine curing agent to those that cure only upon application of heat. Accordingly, Applicants are of the position that claim 16 is to be interpreted to encompass any and all amine curing agents capable of crosslinking or chain extending precursor polymers having epoxy groups on at least some of the repeat monomer units thereof, and respectfully request reconsideration and withdrawal of this ground for rejection.

The Examiner has stated with respect to claim 33 that there is no requirement in the claim that "A" groups be present. To clarify this matter, Applicants have amended claim 33 to recite that  $x$  is 1.

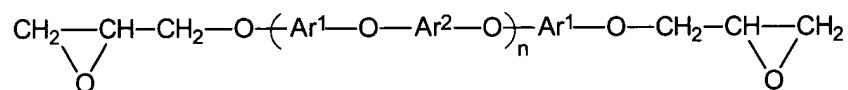
With respect to the rejection of claims 57 to 60 under §112, first paragraph, the Examiner has stated that Applicants have failed to state where support for the addition of limitations to molecular weight can be found in the original specification and claims, that a question arises regarding to which polymer these values refer, and that the specification provides support on page 58 for these ranges referring to the polymer of the indicated formula used to prepare the curable polymers and not to the curable polymers.

Although Applicants are of the position that the claims in their original form satisfy the requirements of §112, first paragraph, to

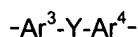
facilitate prosecution, Applicants have amended these claims to clarify that the molecular weight values referred to therein are directed to the polymers from which the epoxy-substituted precursor polymers are prepared, and believe that this amendment eliminates any possible basis for this ground for rejection. As the Examiner has stated, support for these molecular weight values for the preprecursor polymers is found in the original specification at page 58.

The Examiner has rejected claims 64 to 66 under §112, first paragraph, stating that Applicants have not indicated where in the application as filed these claims are supported. These claims are supported in the specification as filed at, for example, page 68, lines 16 to 24. Applicants accordingly respectfully request reconsideration and withdrawal of these grounds for rejection.

The Examiner has rejected claims 16, 45, 57 to 61, and 64 to 66 under §102(b) as being anticipated by Tsubaki et al. and has rejected claims 16, 33, 45, 62, and 69 under §103 as being unpatentable over Tsubaki et al. Tsubaki et al. discloses an epoxy resin substantially represented by the general formula



wherein Ar<sup>1</sup> is a residual group of a dihydric phenol derived from a compound having one or two benzene nuclei, Ar<sup>2</sup> is a residual group of a halogen-substituted benzenoid compound having two halogen atoms on its nuclei and represented by the formula



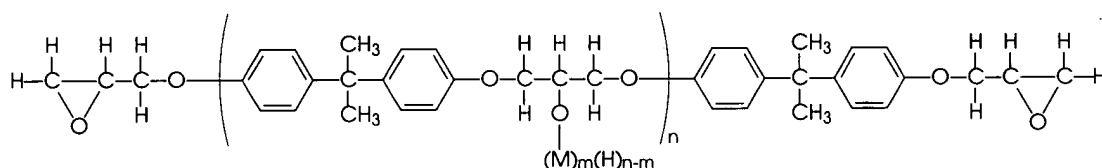
wherein each of  $Ar^3$  and  $Ar^4$  is a hydrocarbon group having a divalent benzene nucleus and Y is a sulfone group or a carbonyl group, and n is an integer of from 1 to 50.

The Examiner has stated that Example 8 of Tsubaki et al. anticipates the composition of instant claims 16, 45, 57 to 61, 64 to 66, and 69 if the chain extended polymer of claim 16 is the product of (i) the product of the instant formula that has been further reacted at the ends to form epoxy groups and the end groups are instant B groups reacted with (ii) an amine curing agent.

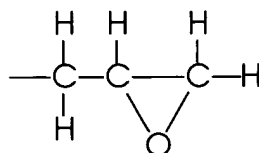
Applicants disagree with this position. Tsubaki et al. teaches a polymer having terminal epoxy groups. See, e.g., column 4, lines 15 to 24 and column 5, lines 20 to 25 as well as the molecular structures at column 1, line 35, column 5, line 50, column 6, line 32, and column 10, line 1. Nothing in this reference, however, teaches or suggests a polymer having epoxy groups on the repeat units thereof. In contrast, the present invention is directed to a composition which comprises a crosslinked or chain extended polymer having been formed from a precursor polymer having epoxy groups contained on at least some of the monomer repeat units thereof, said crosslinking or chain extension having occurred through linking groups formed by a reaction between the epoxy groups contained on at least some of the monomer repeat units of the precursor polymer and amine groups on an amine curing agent. Since Tsubaki et al. fails to teach or suggest a polymer having epoxy groups in at least some of the monomer repeat units thereof, Applicants are of the position that this reference does not anticipate and does not render obvious the present invention, and

accordingly respectfully request reconsideration and withdrawal of this ground for rejection.

The Examiner has also rejected claims 16, 44, 57 to 59, 61, 62, 64, and 65 under §103 as being unpatentable over Yokoshima et al. Yokoshima et al. discloses a photoimaging resist ink containing (A) an unsaturated group-containing polycarboxylic acid resin which is a reaction product of (c) succinic anhydride with an additive reaction product of (a) an epoxy resin with (b) an unsaturated group-containing monocarboxylic acid, wherein (a) the epoxy resin is represented by the formula



wherein M stands for



n is at least 1 on the average, and m is 1 to n on the average. In specific embodiments, the resist further contains (B) a photopolymerization initiator, (C) a diluent, and (D) a curing component. In forming a solder resist pattern by exposing a coating film of a resist ink through a patterned film to ultraviolet light and developing the coating film to dissolve away the unexposed portions thereof, the resist ink is excellent in developability and photosensitivity, while the cure product thereof is excellent in flex resistance and folding resistance, heat resistance, and



the like. The resist ink is especially suitable as a liquid solder resist ink for flexible printed circuit boards and thin pliable rigid circuit boards.

The Examiner has stated that Yokoshima et al. teaches a derivative of an epoxy resin that reads on the instant formula of claim 16 when A is

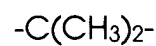


and B is



and B is substituted with  $-\text{O}(\text{M})_m(\text{H})_{n-m}$  and that the reference teaches use of an amine curing agent.

Applicants have amended claim 16 so that when A is



B cannot be



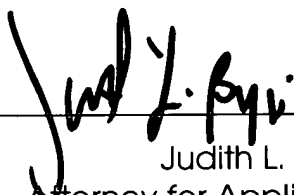
and believe that this amendment eliminates any possible basis for this ground for rejection.

Applicants believe that the foregoing amendments and distinctions place the claims in condition for allowance, and accordingly respectfully request reconsideration and withdrawal of all grounds for rejection.

Application No. 10/036,469

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is hereby authorized to call Applicant(s) attorney, Judith L. Byorick, at Telephone Number (585) 423-4564, Rochester, New York.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Judith L. Byorick", is written over a horizontal line.

Judith L. Byorick  
Attorney for Applicant(s)  
Registration No. 32,606  
(585) 423-4564

JLB/cw  
October 3, 2003  
Xerox Corporation  
Xerox Square 20A  
Rochester, New York 14644